

# agriculture

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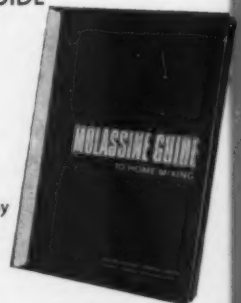
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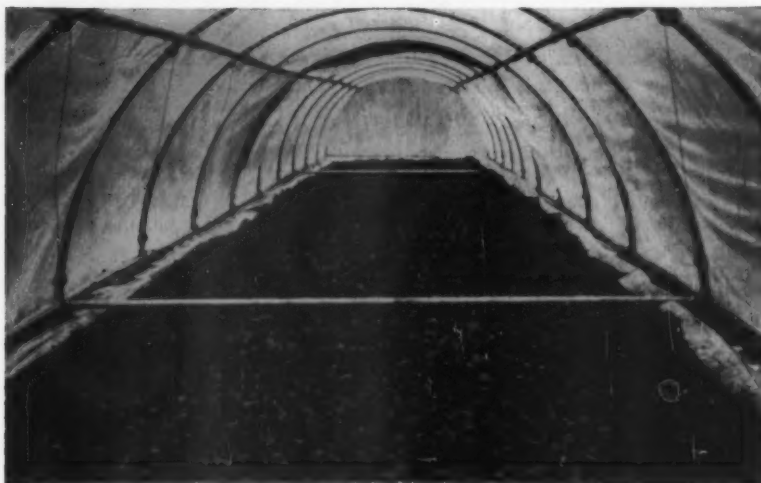


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*Watercress crop inside polythene covered structure*

Declining production has prompted an A.D.A.S. team to take a new look at

## WATERCRESS

C. P. Stevens

WATERCRESS (*Nasturtium officinale*) is an indigenous cruciferous plant which grows naturally in shallow streams. Its use is mentioned in historical writings going back hundreds of years, even to Roman times when it was considered a stimulant in battle. Watercress may be eaten on its own, as a constituent of a salad, as a soup or as an ingredient in many other meals and, last but not least, as a garnish. Apart from these culinary uses it has many claimed medicinal virtues. Being rich in minerals and vitamins and low in calories it is good for those who are slimming. However, its claims to increase fertility and virility are more in doubt. Much of its character is due to the presence of mustard oil, which gives it its pungent flavour.

### Early cultivations

Watercress was first cultivated in a small way early in the fourteenth century in France. Later, more extensive cultivation took place in Germany. However, it was not until 1808 that it was grown in the British Isles, when William Bradbury established beds at Springhead, near Northfleet in Kent.

Since then, changes in cultivation techniques have been few, though there have been improvements in strain. Originally brown cress, so named because of its brownish purple leaves, had pride of place, with green cress, a more

delicate plant, being not so highly valued and used for late spring production. However, brown cress proved very susceptible to crook root disease; as a result its use declined and it is now almost non-existent.

Seed of green cress has come from several different countries. Until recently a pale green strain originating in France has been used but a change in taste preferences has led to its being replaced by a dark green strain believed to be of American origin.

### **Situation today**

At present there are 350-400 acres of cultivated watercress in England. The main area is in Hampshire, with smaller acreages in Dorset and Wiltshire, a declining acreage in Hertfordshire and isolated areas in other counties. Twenty-five years ago the acreage was double this figure. The reasons for this decline are: a static demand, increased costs and a virtually static price. These three factors have meant that watercress growers have had to intensify production; those unable to do so because of a limited water supply or problems with labour or crop management have ceased production.

What is required for the future is a planned output throughout the year of a high quality product in a fresh condition and at an economic price. When this is achieved the industry will be in a healthy condition and expansion may become necessary. Some work has been done at the National Vegetable Research Station into the control of crook root disease and the causes of flowering and at Lee Valley Experimental Horticulture Station on protected cropping.

As a result of representations made to the Ministry by the Hampshire Agricultural Executive Committee, it was decided in 1968 that an experimental project should be set up with the costs being shared between Messrs. Hampshire Watercress Ltd. and the Ministry of Agriculture, Fisheries and Food. The day-to-day management of the beds is being undertaken by the Company with an A.D.A.S. adviser supervising the experimental treatments, crop harvesting and recording. The project has the full co-operation of the Meteorological Office. A small committee representative of A.D.A.S. husbandry and science disciplines and of Hampshire Watercress Ltd. has been established to decide the broad lines of investigation, which are:

- (a) water flow rates through the bed;
- (b) quality winter production by protecting the crop;
- (c) addition of nutrients to promote better growth;
- (d) development of strains to produce those most suited to all-the-year-round production.

It was also decided that in the long term a recommended method should be produced for growing watercress both in the open and under polythene protection.

### **Experimental beds**

The site of the experiment is at Fobdown Farm, Abbotstone, in the Itchen Valley near Alresford, 220 feet above sea level and on the bank of the Candover Brook, a tributary of the Itchen. Commercial watercress beds follow the line of the valley to the north and south of the experimental site. Water is supplied by two 200 feet deep boreholes and a line of springs arising from the underlying chalk strata, which give an output of 8-14,000 gallons per hour by artesian pressure. As this quantity is insufficient for experimental

requirements it is boosted by a surface pump to 20,000 gallons per hour during the winter period.

There are seventeen beds, each measuring 60 feet long by  $7\frac{1}{2}$  feet wide. They run in an east/west direction, with a fall of 2 inches over their length, and have a base composed of several inches of sea-washed gravel. Control of the water volume entering each bed is achieved by a system of  $\frac{1}{2}$  in. and 1 in. orifices drilled in a piece of specially treated marine ply mounted vertically across the entrance to each bed. A constant head of water is maintained in the water carrier above, and by this method a known volume of water is let through each hole to fall on to a concrete sill the width of the bed and so be distributed evenly across the bed. Concrete blocks, triangular in cross section, are used at the bottom end of a bed to maintain a constant depth of water throughout its length.



*Bed construction work in progress in 1969*

### **Water throughput**

Running water is always used in commercial watercress growing. It is necessary, first, to provide the crop with a high proportion of the nutrients it requires for growth (the remainder coming from the base of the bed); and, second, to provide the crop with warmth during the winter. At the Fobdown Farm beds the water rises from a borehole and is at a temperature of  $10.3^{\circ}\text{C}$  when it reaches the surface. The greater the volume of water at this temperature the more the protection it gives to the crop and the better the watercress is able to withstand winter conditions. Obviously the watercress beds should be as near to the source of water supply as possible because during the winter months, when atmospheric temperatures may be below  $10.3^{\circ}\text{C}$  for most of the time, the water will cool rapidly as it travels to and through the beds. The aim of the experiments on water throughput has been to find the rate of cooling down of the water at various flow rates, the pattern this takes and the time of year that each flow rate produces a crop for harvesting. It appears that a flow rate of 400 gallons per hour per yard width of bed is about the optimum when allowing for crop protection and economy in water use. This

rate will provide an excess of all nutrients the crop needs apart from phosphorus, which is normally given by a top dressing of basic slag.

Coupled with the experiments on flow rates have been others on the use and comparison of once-used water, i.e., water which has already flowed through one or more beds. The main difference between once-used and fresh water is its temperature, which is much colder in winter. This fact clearly makes winter production from a bed with such a water supply more difficult. However, many growers do have this problem owing to a shortage of water so possible methods of improving winter production from such beds are being investigated. It is also intended to carry out a microbiological study of the fungi which are present in greater numbers in once-used water to see if they are having any effect on nutrient uptake.



*Polythene covered structures over watercress beds*

### **Polythene protection**

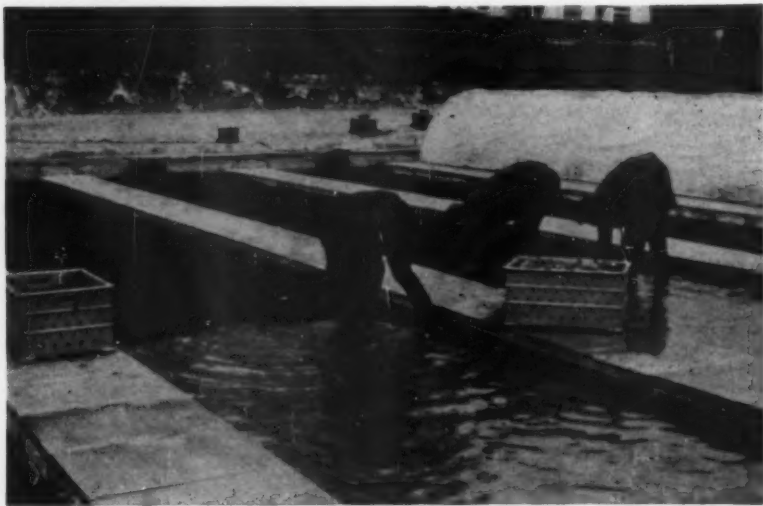
One of the great problems during the winter period is the production of high quality watercress, which means that it should be root free. With an atmospheric temperature lower than that of the water in which it grows, the watercress stems stay below the surface of the water, where it is warmer, and produce roots. A marketable product without roots can be produced under the artificial environment produced by a polythene sheet over the crop.

It was not known when the experiments started whether continuous or short-term covering would be better, and if the latter, what the critical covering stage would be. These questions were quickly resolved. The most suitable arrangement proved to be short-term covering for a period of from one week in March to a maximum of four weeks in January. The crop should be as thick as possible prior to covering in order to minimize the main disadvantage of covering, which is that quality is achieved at the expense of yield.

Since these initial experiments, efforts have been made to minimize loss of yield. One way has been to reduce the loss of light through the polythene, which amounts to about 25 per cent, by removing condensation from the inside surface either by fan ventilation or interior irrigation of the polythene



surface. Fan ventilation has also had another effect; by preventing excessive air temperatures under the polythene better quality watercress and heavier yields have been produced. Another method tried is the enrichment of the atmosphere with carbon dioxide. This is an established practice with tomatoes and lettuce in glasshouses. Consistent and appreciable increases in yield have been obtained in this way. Other techniques to increase light transmission are to be tested and a more detailed study of conditions under polythene covers is to be made.



*Crop harvesting*

### **Development of strains**

So far only the strains in use commercially have been tested. Also a quantity of seed has been subjected to gamma ray irradiation, and in the next year or so selections will be made with the aim of producing a strain more suited to summer production. Other work is planned on increasing the levels of naturally occurring chemicals, both in the water and in the plant, to achieve greater yields and higher quality.

### **The future**

If the industry is to survive and expand many of the traditions of the past, such as the 'watercress season', the bunch of watercress and cultural techniques in their present form may have to disappear. The technology of growing and marketing the crop must be matched to the present decade. Already there are signs of a revolution with the introduction of the first true pre-pack of watercress. Many of the solutions to the problems of growing the crop to the specifications of the 'seventies must come from the experimental watercress beds at Fobdown Farm.

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The author, **C. P. Stevens**, is a horticultural adviser with A.D.A.S. at Winchester.

(More detailed information on the experiments described in this article is available in a new report obtainable from the Divisional Agricultural Officer, A.D.A.S., Christchurch Road, Winchester, Hampshire.)

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*Polythene covered structures over watercress beds*

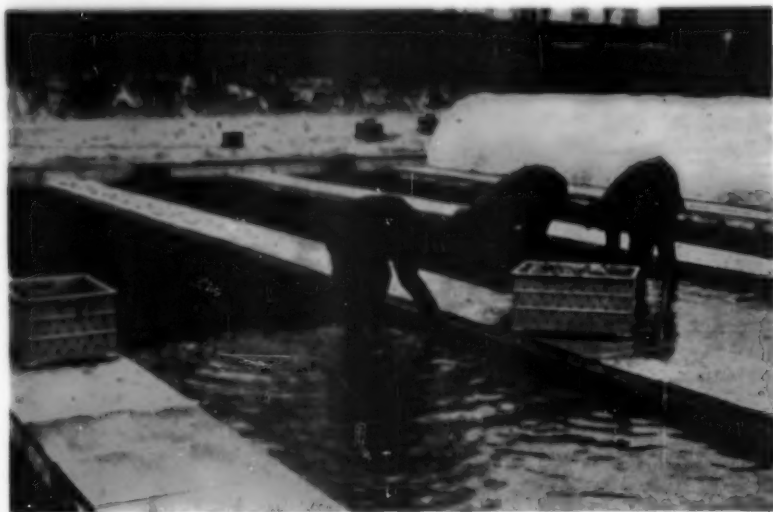
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*Half-round simple farrowing huts on a Sussex farm*

## Economics of Outdoor Pigs

Michael A. B. Boddington

AN article in *Agriculture* February 1969\* described the preparations made by the Departments of Agricultural Economics at Wye College and Reading University for a survey of outdoor pig keeping. It also presented the results of a postal survey of some 900 pig producers that had been conducted in the search for co-operators for a full costing survey, and discussed the distribution and characteristics of the outdoor pig herd so far as these could be determined from the results of the postal survey. The full investigation of the enterprise has now been completed and a report in the *Agricultural Enterprise Studies in England and Wales* series has been published.† This article summarizes some of the chief findings of the survey.

### Outdoor v. indoor units

One objective of the costings survey was to establish the economic performance of outdoor pigs in comparison with breeding herds kept indoors. The costing method was very similar to that used by the Universities of Cambridge and Exeter in their pig management surveys so that a comparison of the results obtained with data published by those universities is legitimate. This comparison is presented in Table 1, from which it will be seen that the surplus per £100 gross output and per sow achieved by the outdoor breeding

\*Vol. 76 No. 2 pp 60–65: Boddington and Sykes.

†*Outdoor Pigs: Results of an Economic Investigation* by Michael A. B. Boddington, obtainable, price 75p post free, from the Publications Secretary, School of Rural Economics and Related Studies, Wye College, Ashford, Kent; also from the Department of Agricultural Economics, Reading University, Building No. 4, Earley Gate, Whiteknights Road, Reading RG6 2AR.

herd was higher than that recorded on other surveys over the same time period. In terms of productivity the outdoor herd does not compare favourably with the indoor breeding unit on any score. In the final analysis the numbers weaned per sow is about two fewer than would be expected of most indoor herds. This is not surprising in an extensive system where there is little control over mating, and farrowing is largely unsupervised.

**Table 1.**  
Results from outdoor units compared with those obtained from intensive breeding herds

Recording centre:	Outdoor herds	Indoor herds		
	Reading and Wye*	Cambridge*	Exeter*	Wye†
Number of herds	41	20	27	12
Costs and returns per £100 gross output	£	£	£	£
Feed	62.49	60.0	63.1	62.6
Labour	9.49	13.0	10.9	11.5
Other	9.73	13.9	8.9	12.1
Surplus	18.29	13.1	17.1	13.8
Surplus per sow	19.12	11.85	18.3	11.65
Litters per sow	1.78	1.95	1.76	1.67
Live births per sow	16.95	20.28	N.A.	17.22
Piglet deaths per sow	2.17	3.51	N.A.	2.48
Pigs weaned per sow	14.78	16.77	14.3	14.74
Feed conversion ratio (lb/lb liveweight gain)	4.81	4.6	4.85	5.47
Percentage mortality	12.82	16.54	12.58	14.67

\*for year ending 30th September 1969    †for year ending 31st March 1969

Sources:

Ridgeon, R. F., *Results of Pig Management Scheme, 1969*. Agricultural Economics Unit, Department of Land Economy, University of Cambridge, 1969.

Burnside, Estelle and Rickard, R. C., *An Economic Study of Pig Production in South West England, 1968/69*. University of Exeter, Agricultural Economics Unit, Report No. 180, 1970.

Boddington, M. A. B., *Pig Production in Kent: Results for a Small Sample of Farms*, School of Rural Economics and Related Studies, Wye College, 1970.

The outdoor herd exchanges high productivity for low capital cost, low labour charges and a system which permits greater ease of management. It must be emphasized in this context, however, that stockmanship is of vital importance, the pigman being in a similar position to a shepherd. The results, in terms of surplus per sow, seem to justify the outdoor system and suggest that a profitable enterprise may be run on an extensive basis without forfeiting financial success.

### All or part year outdoors

The 1969 article observed that some herds were put out to pasture only during the summer and were brought indoors during the winter months; all the signs of the postal survey suggested that herds outside all the year would prove most successful and it was concluded that these should be watched closely. Of the fifty-two herds partaking in the costings survey at one time or another, seven were out of doors only in the summer; of the remaining forty-five, six farrowed sows down inside and moved to pasture within the following one or two weeks. Thus, thirty-nine, by far the majority, had sows and litters farrowing down at pasture all the year round.



*Farrowing huts with dry sow housing in background*

Table 2 summarizes the results for these different categories for the year 1st October 1968 to 30th September 1969. The evidence shows that the more truly outdoor a herd is, the more profitable it is likely to be. Surplus per £100 gross output rises quite markedly through the first three columns of the table. The samples in the first two columns are very small and results may be distorted by the influence of one dominant herd so that no great weight may be placed on the figures. But the evidence is that herds with some degree of environmental control, either during the winter or at farrowing time, achieve a higher level of productivity and that the expense involved in achieving it more than offsets the gains thereby obtained. Feed conversion rate, contrary to expectations, is poorer in herds housed indoors for the whole winter than in those housed for farrowing only, and the latter, in turn, show a lower efficiency in conversion than those which are totally out of doors. This is reflected in the figures for feed cost per £100 gross output. Labour charges per £100 gross output are considerably increased as soon as steps are taken to bring pigs inside to any extent, and the same is true of veterinary and medicine charges.

Housing costs per £100 gross output for herds kept indoors in the winter are more than three times higher than those for herds kept entirely at pasture. This major discrepancy arises because farmers who house their breeding stock indoors during the winter months and at pasture during the summer have to invest in both indoor and outdoor accommodation. In this case the housing overheads will be higher than for the average herd housed completely indoors, thus negating one of the main benefits of outdoor production.



A compensating factor is that grazing charges are lower, but only slightly since the main burden of the cost of pasture falls during the summer months.

The lesson to be learned from these results would seem to be that there is nothing to be gained from half-measures. A herd must be either totally outside or totally inside.

**Table 2**

**Comparison of results between herds kept out of doors for part of the year and those kept out of doors all year**  
**1st October 1968—30th September 1969**

	Part year	All year			All herds
		Farrowing inside*	Farrowing outside	Total all year	
Number of farms	4	4	33	37	41
Average herd size	131	83	185	174	170
Costs and returns per £100 gross output	£	£	£	£	£
Feed	68.27	62.27	61.86	61.88	62.49
Labour	17.05	14.59	8.40	8.70	9.49
Veterinary services and medicines	3.66	1.26	1.20	1.21	1.44
Sundries	6.02	3.12	3.41	3.39	3.58
Housing	3.46	1.63	1.05	1.08	1.31
Equipment	1.17	0.35	0.81	0.79	0.83
Grazing	2.27	3.19	2.29	2.34	2.33
Other overheads	0.70	0.13	0.29	0.28	0.24
Total costs	102.60	86.54	79.31	79.67	81.71
Surplus	-2.60	13.46	20.69	20.33	18.29
Litters per sow	1.85	1.74	1.78	1.77	1.78
Pigs reared per sow	16.27	14.68	14.66	14.66	14.78
Percentage mortality	10.61	13.65	12.97	13.01	12.82
Feed conversion ratio (lb/lb liveweight gain)	4.96	4.84	4.78	4.79	4.81

\*Farrowing down in indoor accommodation but moving outside in 1-2 weeks

### Some characteristics of outdoor herds

It is to be expected that a system requiring a hardy yet docile sow makes extensive use of the Saddleback. Most of the herds on the costings survey consisted of either pure Saddleback or Saddleback cross sows. They produce good, strong stores and they are also easier to contain with an electric fence than many other breeds. On the other hand, two-thirds of the herds used Large White boars which, together with Landrace boars, were most popular.

It was anticipated that the rigours of living out of doors would lead to a high turnover in sows, but this did not prove to be the case. At the outset of the survey farmers were asked what proportion of their sows they replaced annually and the average of the replies to this question indicated that sows at pasture have a useful life of between four and five years. This figure was checked by assessing the number of sows replaced as a proportion of the total number of sows in the costings survey. The results showed that about



*Elaborate farrowing houses*

20–25 per cent of the average herd is replaced annually, figures which closely agree with those given by the farmers.

Two other hypotheses which were formulated at the beginning of the survey were also proved wrong. The first was that piglets would tend to be weaned at a rather later stage outside than they would inside. In fact, 55 per cent of herds on the costings survey weaned little pigs at less than eight weeks of age, although only two herds weaned at under five weeks. The second theory was that the proportion of little pigs dying would probably be higher than with an indoor herd. Piglet mortality ran at just under 13 per cent for herds on the survey and this figure is lower than comparable figures for indoor herds in which about 15–16 per cent of piglets born die before weaning. The reasons for this unexpected result are probably twofold. The use of the Saddleback sow, well known for its good mothering ability, may help to reduce losses; also, there is a good possibility that, on an extensive outdoor system where personal supervision is difficult, many pigs which die within the first 24 hours of farrowing are listed as born dead and not among the live births.

On the original 'Roadnight' system, herds farrowed down twice a year as a whole. Farrowing times were generally March and September, allowing the little pigs to be brought up outside the most difficult winter months. Were this practice to be widely adopted, marketing problems could arise at certain times of the year when large quantities of weaners and stores would suddenly become available. The outdoor herds on the costings survey could, between them, make 50,000 weaners available; coming at one time this could cause a serious market imbalance.

In fact, three-quarters of the herds on the survey farrowed down either continuously or in monthly batches and only 8 per cent retained the practice of twice-a-year farrowing. Apprehension about the marketing problems of outdoor herds were thus found to be without foundation. The pattern of farrowing fits well with the marketing arrangements used by most of the producers. These involved transfer to a fattening herd on the farm, private agreements and contractual arrangements. Only 10 per cent of farmers sent their weaners or stores to livestock markets.

## Outdoor pigs on the arable farm

At the beginning of the survey it was intended that considerable emphasis should be placed upon the effectiveness of the outdoor pig herd as a cereal break. It was planned to make a detailed investigation of a few farms to establish the relationship between the pig break and subsequent cereal performance. When the numbers of factors which could affect cereal yield were listed and a data collection scheme drawn up, it became apparent that it would be difficult, if not impossible, to investigate satisfactorily this aspect using a commercial farm costing survey. It is hoped that some organization will set up an experimental unit to establish more precisely the effect of pigs upon cereal yields, subsequent fertilizer requirements and the level of cereal diseases.

All arable farmers on the survey were regularly asked about their policy in relation to cereals and pigs, and for information concerning the level of yield of different crops and the amount of fertilizer used following the pig break. From these data it is possible to gain a general picture of the effect of pigs on subsequent cropping.

Many farmers felt it improvident to hazard any estimate of increases in cereal yields as a result of using a pig break. Of those who cared to do so, most thought that there was an increase in yield of between one and ten hundredweights per acre. Others preferred not to give a precise figure but suggested that there was some increase. Four farmers thought that the effect of pigs on cereal yields was negligible; seven, that the yield increase was noticeable in the second and even third cereal crop following pigs. Some co-operators said that their yields were actually down after a pig break. They accounted for this by the fact that the fertility boost gained from the pigs induced crops to lodge much more easily.



*Banks of sow and litter arks with enclosed runs to front. The arks are pulled forward frequently*



*Simple half-round huts are pinned down to prevent them from being blown away*

With regard to the use of fertilizers on crops following pigs, several farmers said that they would use less. A few gave actual quantities and these ranged from 15 units of nitrogen to two hundredweights of an unspecified compound

fertilizer. One or two farmers use no fertilizer at all for the first crop after pigs and some said that they would use less on the second crop.

For the arable farmer there are considerable attractions in the use of a pig break, not least of these is the surplus of £80-100 per acre—based on a stocking density of four sows to the acre—which they can produce. This is very high in comparison with most other crops and livestock alternatives, and leads some producers to observe that they grow cereals as a break from pigs. But two of the advantages of the system when it is viewed as a pig enterprise are, paradoxically, disadvantages to the arable farmer.

First, labour costs are generally much lower on the outdoor unit than they are for indoor herds. On an arable farm of, say, 800 acres, however, a 400-sow unit may take up only 100 acres and may need up to five men to tend it. This is an extravagant use of labour on many cropping farms where a standard of one man to 200 acres is more nearly the norm. Secondly, whilst a pig farmer may see a capital investment in housing and equipment of £15 per sow as a ludicrously small sum, an arable farmer would view an expenditure of £250 per acre, in stock and overheads, with a certain amount of apprehension.

In spite of these strictures, the return on capital is very high and many arable farmers see the outdoor pig unit as an essential part of their farming system.

### **In conclusion**

The evidence suggests that the outdoor pig breeding enterprise is currently most common in south and south east England, although it has been reported elsewhere in Britain, notably eastern Scotland. It seems likely that increasing costs in pig production and the search for a truly profitable enterprise as an alternative and break for cereal crops on the arable farm will enhance its popularity. At the same time, it is improbable that the outdoor pig system will gain anything more than moderate success on heavy-land farms.

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### **Examination of the Horticultural Industry 1970**

The record of the third Examination of developments within the horticultural industry in the United Kingdom has been published.\* It is a factual study of trends in production and in the ways in which growers market their produce, and brings up to date the earlier Examinations made in 1965 and 1967.

The Examination was carried out in 1970 in a series of meetings between officials of the Agricultural Departments and representatives of the National Farmers' Unions, the Mushroom Growers' Association and the Horticultural Trades Association. It did not speculate on the possible effect of United Kingdom entry into the European Economic Community. Specialist groups studied fruit, vegetables, glasshouse crops, mushrooms, flowers and bulbs, and hardy nursery stock, and their individual reports are included in the published record. The record also includes statistics on home production and imports of selected crops since 1956/57, as well as bringing up to date the statistical material published in the records of the 1965 and 1967 Examinations.

\*Copies of *Examination of the Horticultural Industry 1970* can be obtained from H.M. Stationery Office, price 56p (by post 61½p).

If cows show nervous symptoms  
and low milk yield it may be

## Acetonaemia

D. C. J. Maidment

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THE first signs we noticed were that she refused her cake and her milk was down. She was listless, and on further examination we found that her breath had a distinctly sweet smell and her dung was firm but greasy, rather like horse-dung. She had calved only a fortnight before and was one of our highest producing cows.

### Symptoms

To many dairy farmers the symptoms of acetonaemia will be instantly recognizable. Some may have also seen the less common form of the condition when an affected animal shows strange nervous symptoms, which may include walking into objects and pressing the head against walls. Some cows will aimlessly lick themselves and their surroundings or walk in circles with a curious high-stepping gait.

Acetonaemia almost always occurs soon after calving, certainly within six weeks of that event. It is most common in the winter, but can appear at any time of the year. Although the condition is rarely fatal, the period of recovery may be long and during this time milk loss can be substantial. The graph at Fig. 1 shows the lactation curve of our affected animal, Beauty 5th. Her milk yield was clearly depressed for nearly three months, with a total loss during that period of nearly 200 gallons. Her yield did not recover until she eventually went out to grass in the spring. This was not an isolated case as other cows in the herd with acetonaemia showed similar yield reductions and slow recovery patterns.

### Causes

To find the causes of acetonaemia, or as it is also called ketosis, we must consider the cow's diet. A large proportion of its energy producing food consists of carbohydrate. This is fermented in the rumen to form three substances, acetic, butyric and propionic acids. The cow absorbs these acids and uses them for energy and production of fat and milk sugar.

We can simplify these processes into two stages. In the body acetic and butyric acids are converted into acetate, and propionic acid into glucose and milk sugar. The acetate and glucose then combine to form fat and energy. If, however, there is insufficient glucose in the animal's system, the acetate cannot be converted into fat and energy and accumulates in the body in the form of acetone. Acetonaemia is named after this acetone which has built up abnormally in the tissues of the cow. Although the whole herd may be having the same diet, some animals appear to have a predisposition to acetonaemia. This may be due to abnormal levels of the hormones which control glucose formation and breakdown.

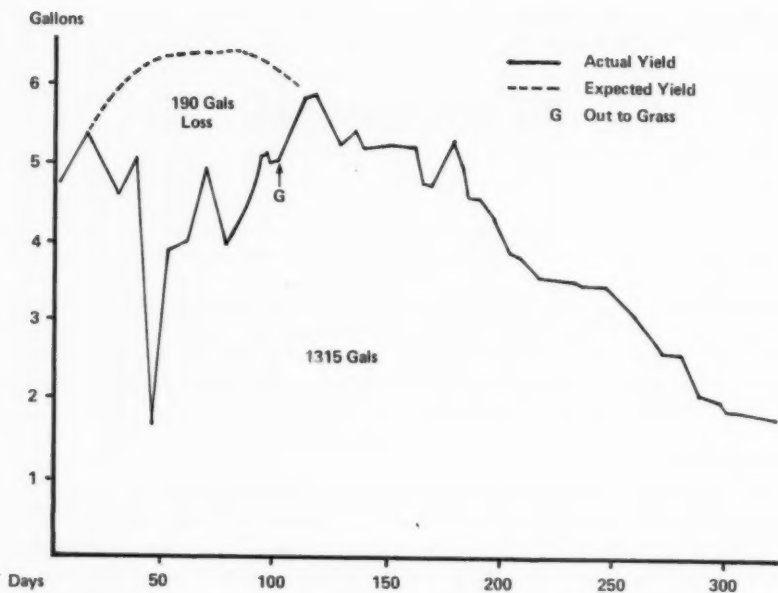


Fig. 1. Effect of acetonæmia on Beauty Fifth (calved 25-12-68)

## Treatment

Treatment of the condition is aimed at increasing the level of body glucose. This can be done directly by injecting glucose solutions, or indirectly by injecting cortisone-based drugs which encourage glucose formation inside the body. The indirect method is normally more convenient. These injections may be followed by drenches of glycerine. Usually half a pint of glycerine is diluted with water and given each day for four or five days; treacle can be used in a similar role. Both substances are converted into glucose in the body.

## Prevention and diet

If acetonæmia is to be prevented, it is essential that we first look at the herd's diet very carefully.

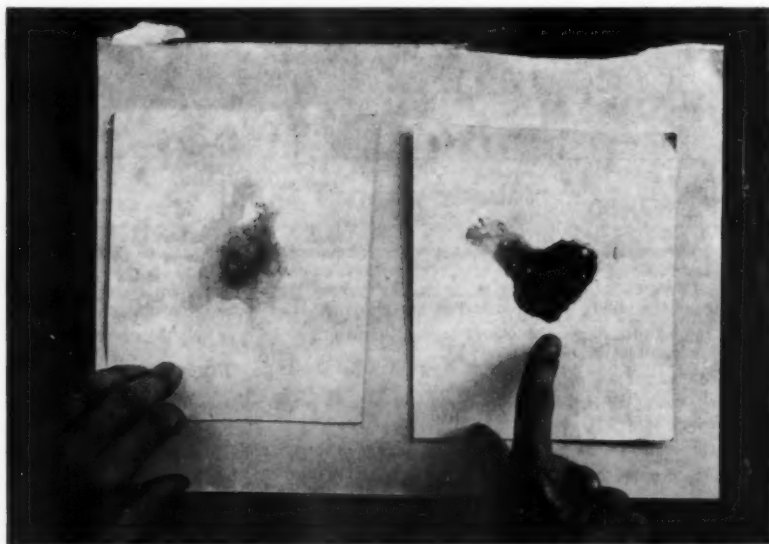
1. The energy needs of an animal which has recently calved are very great. A simple overall deficiency of energy in the diet of a high-producing cow may cause acetonæmia.
2. The type and amount of energy food has to be examined. Those which produce large amounts of propionic acid in the rumen, such as flaked maize or finely-chopped hay, are to be recommended. Feeding large amounts of silage, particularly if it is butyric in quality, is undesirable. High protein feeds can have a similar effect to silage in encouraging acetic and butyric acid formation. Feeding inadequacies are reflected by low blood glucose levels. The use in the future of Herd



Metabolic Profiles will increasingly highlight these deficiencies.

3. Results of some investigations suggest that glucose formation can be affected by low levels of cobalt in the diet. Feeds from soils low in cobalt should be supplemented.
4. It is often possible to prevent acetonæmia by adding salts of propionic acid to the ration for a few weeks after calving.
5. Housed cattle appear to suffer from the condition more than those at pasture. Exercise or early turning out in the spring may help the problem herd.
6. Many of the body's complex chemical changes involving glucose, fats and proteins take place in the liver. Liver fluke infection can affect the function of the liver sufficiently to cause acetonæmia. As infection with this parasite is far more common than many people think, the possibility of fluke in acetonæmic cows should be investigated. Laboratory analysis is made by finding fluke eggs in the dung.

If a freshly calved cow suffers from indigestion, hypomagnesaemia, infections, or particularly, a displacement of the fourth stomach and as a consequence her appetite is reduced, she often has acetonæmia as a secondary feature. In fact it can be said that the dairy cow is always on the verge of acetonæmia. Treatment of the primary cause is necessary to remove the secondary symptom.



*Fig. 2. An easy test for acetonæmia. Milk containing acetone turns Rothera's Powder purple. It can be seen that normal milk, on left, had no effect on the white test powder, but milk from cow suffering from acetonæmia, on right, produced deep purple colouration. This test is often used by the veterinary surgeon in diagnosis of the condition*

## **Milk loss**

To many dairy farmers acetonæmia may not appear to be a serious problem; on many farms it is rarely seen. However, when it does occur, even

as an apparently minor problem, the milk loss is larger than expected and this makes investigation on a herd basis worthwhile. One or two clinical cases of the condition could be only the tip of the iceberg because other animals in the herd may be suffering from subclinical acetonæmia, which goes undetected apart from an overall reduction in yield. Also, the incidence of acetonæmia in a herd may be an indication of infertility problems to come. Cows which receive inadequate energy intake after calving are difficult to get into calf. The possibility of this additional problem makes energy feed levels doubly important. Sufficient attention to a balanced diet of suitable energy feeds will result in a worthwhile saving.

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## Nobody wants T.G.E. !

T.G.E. (transmissible gastro-enteritis) is a virus disease of pigs which causes deaths in young piglets and scouring in the whole herd. It is transmitted very rapidly and easily by movements of pigs and by dung contamination carried by lorries, people, birds, dogs and vermin and possibly by the wind. Transport lorries carrying pigs are especially dangerous.

You can protect your herd when disease is known to be in your neighbourhood by taking the following precautions:

Do stop purchasing pigs;

Do stop animal transport lorries coming right into your premises: instead load up at the farm gate;

Do stop visitors walking round the farm and particularly from getting amongst your pigs;

Do place disinfectant boot dips at the farm gate;

Do stop birds getting to pigs and pig food by using bird scarers and placing nets over doors, etc.;

Do inform your veterinary surgeon immediately if you have any suspicion of disease.

Don't visit other pig farms;

Don't visit pig markets;

Don't sell pigs if you have any suspicion of disease in your herd;

If you get disease don't let dogs and vermin get at dead pigs.

Disinfectants effective against T.G.E. include 2.5 per cent lysol, 2 per cent formalin, and hypochlorite solutions containing not less than 0.5 per cent of available chlorine. But always remember that disinfectants are less effective in the presence of dirt—so clean before you disinfect, and replenish foot-baths frequently.

Common sense precautions like these will help to prevent the spread of disease.



*Continental growers' pack of selected cherries in 1 kg punnets*

## Cherry Cultivation on the Continent

Hilary M. Hughes

CHERRY growing in England is always associated with Kent, with the glory of the trees at blossom time a feature of the north Kent coastal plain. But cherries have also been grown traditionally in the Hereford-Worcester border region, in parts of the Chilterns and adjacent to these areas. It is a sign of the times perhaps that as the north Kent electric railway brings the commuters into London their neat, post war houses are sometimes set amongst derelict cherry trees.

The acreage of sweet cherries has declined dramatically in the past two decades from nearly 17,000 acres in 1951 to barely 4,000 in 1970. What are the reasons for this decline and can it, and should it, be arrested? In order to compare the sweet cherry production in England with some Continental areas and to investigate the possibilities for the future, the author undertook a short, and necessarily limited, visit in July 1969 to some of the production areas in West Germany, east Switzerland and the Netherlands.

### Continental output

In West Germany acreage statistics are not obtained, but all growers of more than twenty-five trees make returns which indicate a total of some 7½ million trees. At least half of these are estimated to be grown in private

gardens and small holdings; even so this leaves a considerable number under commercial production. Bavaria, Baden-Wurtemberg, Hanover (Niedersachsen), Rhine Pfalz and North Rhine Westphalia are the main producing *landes*. The estimated total tonnage of the crop is between 110,000 and 170,000 compared with a British output in the last few years, depending on season, of some 7,000 tons. In the 1950-60 decade British production was estimated at 20,000 tons annually.

However, both the German and Swiss (but not the Dutch) outputs are misleading in terms of fresh fruit since a large proportion of the sweet cherry crop is used in the production of brandy. In south Germany particularly, many small sized varieties with juice of high density are grown which are suitable only for brandy distillation. The fruit is harvested when very ripe, being pulled off without the stalk. A proportion of the large sized dessert varieties is also pulled for brandy or jam production, depending entirely on the state of the market. The price offered to the village cherry co-operatives by the processors is often not agreed until well into the harvesting period and is dependent on the total estimated crop. When the market price is at all low, the growers prefer to sell their fruit for brandy distillation if the price is fair because marketing costs are negligible.

### **Growing methods**

In spite of this demand by processors, there is no commercial mechanical harvesting of the fruit because large plantations are seldom grown. In the south and west of Germany most of the sweet cherries are grown in very small units, usually as single rows between fields, along roads, around the farmhouses, or as scattered trees on the hillsides, frequently being inter-cropped with cereals or grass mown for hay. This method of production is also typical in east Switzerland where scattered cherry trees on the middle slopes of the hills, below the pines and above the frost susceptible river valleys, are a feature of the landscape. To the English cherry producer who is plagued by birds this is incredible; although birds can be a problem, particularly round the Bodensee and in north Germany (Hanover), where plantations are more usual, they are not rated the principal enemy as they would be in England. The only possible explanation for this might be the higher numbers of hawks on the continent, the lack of large flocks of urban protected starlings, the lack of hedges and the generally lower numbers of fruit consuming birds. Instead of birds, small deer are a problem on the Continent, since in winter they come down from the pinewoods and graze on the tasty lower branches of the cherry trees. This means that in susceptible areas a standard tree with a 6 ft clear trunk must be grown, while palmettes, bush trees and other intensive forms need deer-proof fencing.

### **Diseases and disorders**

In north Germany and Holland a frequent sight is that of sweet cherry trees either dead or dying from bacterial canker, as alas they can so often be seen in England. But in the warmer southern areas this disease is nothing like the problem that it is in areas where rainfall may be higher and temperatures lower. The everlasting problem of split fruits is found in all production areas. Growers obviously try to avoid growing cultivars liable to splitting, but none are immune; one of the reasons for good mixtures of cultivars is to

ensure not only adequate cross pollination and a long harvesting season, but also that even if some cultivars split under some conditions in one year others escape this problem and produce good fruit.

The trees in the Netherlands are very similar to those seen in England, with rather strong vegetative growth and insufficient fruit spurs in the centres of the trees. As in Britain the acreage has declined, from over 5,000 acres in 1963 to less than 3,000 acres today, and is still falling. Disease, unreliable cropping and poor prices due to competition from Italy and France, the largest E.E.C. cherry producers, have made the energetic Dutch grower grub his trees in favour of other crops; the remaining orchards seen are not well tended.



*In Germany, research stations are trying palmette trained sweet cherries for early cropping and easy to pick trees*

### **Sour cherries**

Sour cherries, of which there are many named strains of the Morello, are much more popular on the Continent than in this country as there is quite a good demand for them on the fresh fruit market as well as outlets for them for jamming, bottling and canning, liqueur chocolate and drink manufacture. North Germany produces the bulk of the sour cherries and many recently planted sweet cherry plantations are interplanted with sour. As the Morello will cross pollinate all sweet cherry cultivars this may be one of the reasons for the good crops of both kinds of fruit seen in some young plantations.

### **Cultivation problems**

The cherry has traditionally been grown on the best brick earth type soils in England, but on the Continent trees were seen growing satisfactorily and cropping regularly on much shallower and lighter soils. Provided there is sufficient water reserve to give adequate fruit size, less deep soils might help

to control tree size. Unlike apples, pears and plums there are no dwarfing or semi-dwarfing rootstocks available for cherries and the vigour of the scion variety plus that of the rootstock, the mazzard, produces very large trees. The cherry is long lived if healthy but slow to come into bearing.

At several research institutes on the continent various systems of closer planting, combined with the tying down of branches to promote early cropping, were being tested. Although some results appear promising, and much earlier cropping can obviously be obtained in this way than from pruned, wide spaced trees, all such trees ultimately become overcrowded. Less vigorous but good quality scions combined with less vigorous rootstocks are being searched for in all countries.

In the southern areas, where bacterial canker and other diseases are less troublesome, the growers are prepared drastically to dehorn—cut the tops off—mature trees. This process helps to rejuvenate the lower branches and prevents all the younger wood and best fruit from growing out of reach of the pickers. The resultant regrowth appears more fruitful and less vigorous than when similar treatment is given in England where, because of disease, the process is seldom attempted so drastically.

## **Cultivars**

As in England there are large numbers of different cherry cultivars grown, some of local origin. There are many synonyms and considerable confusion about different names used for the same fruit from area to area. One of the most popular mid-season to late, large black cherries grown in all three countries visited is Hedelfingen, or more correctly Geante d'Hedelfingen, of which excellent specimens were seen. Another black cherry is variously called Basler Adler in Switzerland or Adler's Späte in North Germany; it is a variety used in a breeding programme at one of the Swiss research stations. At the main Netherlands research station a most useful collection of all the different strains and named sorts of the sour Morello cherry has been planted and these have shown obviously great differences in time of ripening, fertility, tree form, fruit size, colour and quality. Some of the better forms have now been obtained for testing under English conditions, including several from eastern Europe where sour cherries are extensively planted for processing and where more work has been done on selection of varieties. The sweet cherry cultivars raised by our John Innes Research Institute are being tested in all the countries visited. These cultivars are prefixed Merton and several are outstanding for fruit size and quality.

## **Continental optimism**

On the Continent there is reasonable optimism amongst the cherry producers. Because of their good climate the early Italian cultivars tend to swamp the June and early July markets and German growers use mid-season and late varieties to avoid the Italian gluts of fruit. There does not appear to be over-production, as there is with apples, and although the cherry, being a soft fruit, is difficult to market, the village co-operatives enable many small farmers, or part-time growers, to sell fruit in an orderly manner. In Switzerland, where it is estimated some 22 lb of cherries per head are produced each year, compared with less than 1 lb in England, consumption, including those used for distilling, keeps reasonably in step with production and tariffs keep





*Good quality cherries repay hand sorting and careful packing by the Swiss farmer's family*

out E.E.C. produce. Continental housewives seem to wish to buy more cherries than do those in England; this may be due to a distribution problem in Britain, London being well supplied but other British markets less well served.

### **Prospects for Britain**

Both sweet and sour cherries are susceptible to virus diseases and very few cherry orchards are free from them. Some of the diseases have only a small effect on vigour, but some can drastically reduce cropping and cause poor fruit and uneven ripening. Research work to produce virus free cultivars, and the SS certification schemes of the Ministry of Agriculture, Fisheries and Food in Britain which enables such cultivars to be grown by nurserymen here, are ahead of schemes on the Continent. Virus freedom is particularly important with sour cherries.

One or two English growers are now planting sweet cherries more closely than hitherto and using bush trees with unpruned natural growth for earlier cropping. It remains to be seen whether the considerable establishment costs can be recouped by earlier returns from more manageable trees. For the future, the research stations are still searching for less vigorous rootstocks and the plant breeders now appreciate that more moderate growing but heavier cropping types are needed, with fruit ripening over a good long season. In spite of all his problems the cherry grower should be a contented man; for does he not grow, at blossom time, the 'loveliest of trees', as Housman wrote in his poem?

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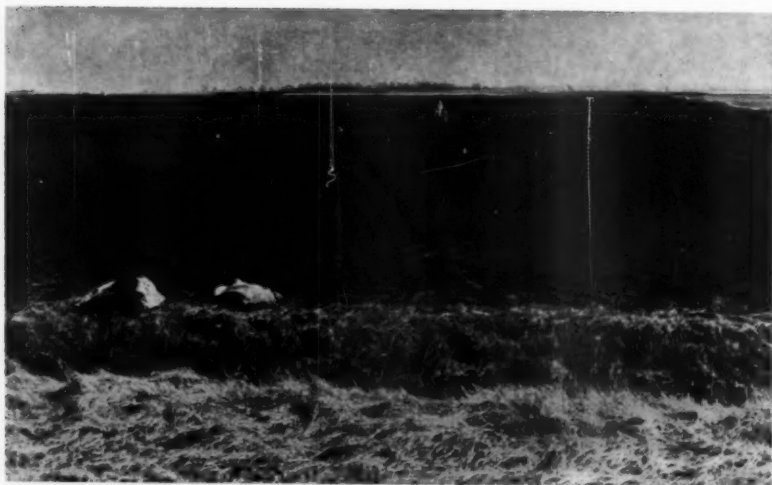
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## FARMELECTRIC



*Planned rationalization of field size could improve farming efficiency and maintain the appearance of the countryside*

## Farming and Wildlife

E. S. Carter

DURING the past few years there has been an increasing interest in the effects of modern farming on the countryside. This concern over the appearance of the countryside and the changes which are taking place in it and their effect on the birds, animals and plants has given rise to much argument and a good deal of misunderstanding.

There is often a very different point of view between those who live in the countryside and make their living from the land and those who are interested in the appearance of the countryside and the wildlife it supports but who live and work in the towns.

### Farming and the landscape

All farming activities disturb the natural state of the land and in fact there is virtually no land in this country which is not, or has not been, affected by man's activities as a farmer. The word farming covers a very wide range of food production from mountain sheep husbandry to intensive arable crop cultivations; in all cases the farmer or grower is striving to make the best use of his resources. Farming has always changed the countryside both in its broad general appearance and in smaller ways. One of the last major changes was the final enclosure of open fields in the late eighteenth and early nineteenth centuries. This was a change which was not always welcomed but which

largely shaped the countryside as we know it today.

To be successful, farming must change and must accept new methods of production with their consequent effects on the appearance of the countryside and on the ways in which farming activities are carried out. Most people resent changes although they are more acceptable when they take place slowly; it is the rapid changes of today which cause resentment and a feeling of uneasiness.

Farmers, too, are concerned about the changes they are making to the countryside and the problems which may arise with the introduction of new production techniques. Those who advise the farmers have also recognized these problems and much time and thought has been devoted to considering the effects of modern farming on the countryside.

### **Silsoe Conference**

In July 1969 a Conference was held at the National Institute of Agricultural Engineering at Silsoe in Bedfordshire which brought together farmers, advisers and wildlife conservationists. Those taking part were asked to look at a farm and to prepare plans for its development along different lines. Limitations were placed upon the capital and other resources available and it was essential that the plans should be practical and show a reasonable profit. The effects of these plans on the appearance of the countryside and on its wildlife were then examined in detail and suggestions were put forward as to ways in which some of the more drastic effects could be minimized. The aim was to find the areas of compromise and to determine what farmers might do to reduce any adverse effects of modern farming on the countryside. Areas of compromise were established and the Conference led to a better understanding between all participants. A full report of the Silsoe Conference has been published\* and several similar successful exercises have since been held in various parts of the country.

### **Role of the farmer**

There are a number of things farmers can do, or can refrain from doing, which will reduce the full effects of modern farming on the countryside. The farmer lives on his farm and therefore is as much concerned with the appearance of the countryside as anyone; but in many cases he may not be sure what can be done or may not know what effect conservation interests will have on his farming system.

The first consideration is to think carefully before making too dramatic an impression on hedges, ponds, wet places, bits of scrub, odd trees and spinneys. There are certainly economic pressures that force farmers into intensifying and making use of every piece of land, but it may take a long time for a farm landscape to recover from drastic changes and after a few years the farmer may well regret the treeless and hedgeless view from his window. On most farms there are areas, perhaps quite small, which are particularly valuable for wildlife and deserving of special treatment. The economic implications of restoring some of these small parcels are often suspect and any calculations should be carried out very carefully before deciding to send in the bulldozer. These bits of woodland or gorse or ponds provide not only

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\*Farming and Wildlife: A Study in Compromise, Royal Society for Protection of Birds, The Lodge, Sandy, Bedfordshire 50p.



*This may appeal to conservationists but is not likely to be tolerated by modern farming practice*

habitats for wildlife but are necessary to maintain a proper balance in the countryside between everything that lives there.

## **Hedges**

The controversy over hedges is a very heated one and there is no doubt that a lot of hedges have now disappeared, particularly in parts of East Anglia. However, there are other very wide stretches of the English countryside where few, if any, hedges have been removed and where it seems unlikely that there will be pressures to get rid of them. The oldest hedges on the farm are those which are richest in plant species and these are most likely to be along the farm or parish boundaries or the roadside. Boundary or roadside hedges should certainly be left and managed carefully; a good hedge is surely a very useful barrier not only for stock but for unwelcome visitors. Country lanes and paths are likely to be used more in the future and if they are clearly defined and bounded by hedges, trespassing into crops will be significantly reduced. Hedge trimming should be left until the autumn and winter to avoid disturbing nesting birds, and where possible should be done on a two or three year cycle to allow the shrubs in the hedge to flower and produce berries which will benefit insects and birds.

It may be difficult to preserve hedgerow timber in these days of mechanical hedge cutting and expensive and scarce hand labour. But if saplings are near the end of a hedgerow they may be avoided without undue difficulty and left to provide variety in the landscape and an important habitat for wildlife. In arable farming situations unploughed corners of fields are expensive and difficult to cultivate with modern machinery. These could be allowed to colonize naturally or, better still, to be planted. But they need to be planted with the right species and in good variety. The best species is undoubtedly the English oak, but it is slow to grow and should be planted in a mixture with birch, rowan or white poplar. Elm, alder, willow and black poplar are other useful trees. Where the corners of four fields meet each corner could be planted and so create quite a worthwhile little spinney.



## Wetter areas

Operations to clean out watercourses usually leave a considerable scar on the landscape. If possible some of the natural vegetation should be left which would lessen the harmful effects on wildlife and, if planned properly, need do little to impede water flow. Trees can almost always be left standing on at least one bank. If these points are discussed well in advance the River Authority may well agree not to clear too big a stretch at any one time.

Small areas of wet, boggy land are very valuable for certain plants, insects and birds, particularly as a wide variety of plants grow only in wet conditions. Some small areas of such land, even if drained, may not necessarily add much to the farm income and the economics of draining and reclaiming small areas like this should be examined very carefully. Experience has shown that on some farms money to be invested in certain small clearance operations could probably be far better invested elsewhere on the farm.

Farm ponds, if they are properly fenced, may become points of considerable conservation interest and if large enough may be worth considering for wild fowl. In America farmers have been interested for many years in fish ponds as a source of wildlife, game and fish; there is plenty of scope for this to develop in England.

## Chemical dangers

Care should always be taken when using pesticides, herbicides and insecticides. Such chemical aids must be used for efficient economic farming and not all are directly toxic to wildlife. However, weeds may provide food and shelter for animals of some sorts—recent research has shown for example that the absence of weeds is reducing partridge populations. Some farmers spray many of their crops as a matter of course without always assessing the economic benefit achieved whereas one should, of course, always observe a sensible spraying programme. Disposal of unused chemicals and empty cans is another problem and great care is needed to ensure that they are never allowed to pollute ponds and watercourses.



*A well maintained hedge in this situation would screen the buildings and act as an effective boundary*

### **A.D.A.S. involvement**

During 1970 members of A.D.A.S. attended short courses designed to increase their awareness of the problems and difficulties which could arise from modern farming practices and to give them an appreciation of the importance of conservation and wildlife. A.D.A.S. staff are not advisers on wildlife matters but they are well aware of its importance and will know to whom farmers should be referred to obtain proper advice. They are also able to consider the effects of farming practice on wildlife in the countryside in general and help to assess the impact of conservation practices on the farm. Close co-operation has been established between A.D.A.S. and the Nature Conservancy and the staff of the Nature Conservancy should be able to assist by giving advice about wildlife on farms.

There are many pressures on farming today, both economic and technical, and there are increasing demands for more access to the countryside. If the ambitions of both the farmer and the conservationist are to succeed a great deal of tolerance, understanding and compromise is needed by all concerned.

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### **Report on Animal Health Services in Great Britain-1970**

The Report on the Animal Health Services for the year 1970 has been published \*. It deals with the various regulations and measures administered through the Ministry's Veterinary Service to prevent the introduction and spread of disease and for the protection of animals; the import and export of animals and animal products; and with the work of the Ministry's Veterinary Research Service. Statistical tables provide information about outbreaks of disease, stock slaughtered and compensation paid.

With the exception of fowl pest, the incidence of notifiable diseases remained low during the year. Fowl pest outbreaks, which began in East Anglia in August, developed into the worst epidemic this country has ever known and the use of live vaccine of the Hitchner B1 type was permitted for the first time. The occurrence of a second case of rabies within Great Britain necessitated for the first time a complete ban on the importation of dogs and cats into this country between March and September. The Brucellosis Incentives Scheme was introduced in July 1970 to replace the Brucellosis (Accredited Herds) Scheme and resulted in a marked increase in applications for voluntary accreditation.

\*Copies of the Report can be obtained from H.M. Stationery Office, price 80p (by post 86½p).

# Work Study in Agriculture

B. McLaren and J. W. Stevenson  
*Lands Arm, A.D.A.S., Durham*

It is claimed that work study in agriculture was first practised around 1240 by Walter of Henley, who wrote a work for the benefit of his son advising him to survey his land, cattle, ploughs and workers. Suitable servants were to be selected and taught how to do the work. The ploughman was to be given instructions which would enable him to plough a certain number of acres per day with a given number of oxen. By the turn of the nineteenth century, Stephens' *Book of the Farm* was proclaiming that 'more than at any previous time perhaps in the history of agriculture, the present day requirement for farm steadings needed to be carefully studied from various points of view. Besides providing ample accommodation, steadings on large farms needed to be arranged and equipped with more regard to labour saving, both in the feeding of livestock and in the handling of farm produce'.

## Ministry encouragement

The lessons of these early pioneers are even more important today to conserve labour, improve working conditions and widen profit margins. So much so that in recent years the Ministry has encouraged an interest in these problems by arranging appreciation courses in theoretical work study for certain members of its staff followed by a practical exercise.

This article describes one such course which took place in the autumn of 1970 when two groups of four students arrived to carry out their practical exercise on a Durham farm equipped with a set of buildings reminiscent of the prize steadings of the last century. They were drawn from various sections of the Ministry's advisory service in Northern England and included officers who specialized in lands and buildings, general agriculture and dairying.

The two problems to be solved were deliberately chosen so that a continual interchange of information between the two groups would be necessary. This worked well and, by enabling each syndicate to draw on the experience of the other, it ensured that the final solutions to both problems were practical.

## Byre feeding

One proposition was to consider the feeding of the dairy cows in the byre. This was an L-shaped part double- and part single-sided cowshed which held 48 cows; milking was into a pipeline and feed was brought by hand and barrow from various surrounding stores. The farmer gave details of the daily ration which he said was fed to the cows. This proved to be quite complex. It consisted of hay, brewers grains, chopped potatoes, swedes and oatmeal in stated quantities, giving a total dry matter per cow of approximately 24 lb, plus purchased concentrates fed at 3½ lb per gallon after the first two.

The study was carried out by observing the milking and feeding routines and by detailed recording of all materials used, together with the time taken during the whole of a typical day's feeding. For practical purposes, this was broken down into the routines on one afternoon and on the following

morning (for which the 'students' had to leave their hotel some ten miles away at 4.45 a.m.). The examination showed that potatoes, swedes and oatmeal were in fact being fed in excess of the quantities stated by the farmer, giving a total dry matter of approximately 32 lb per cow plus the additional concentrates. It was also possible to ascertain the total weights of materials fed per day and the total time in man minutes spent on each material.

During the course of the exercise it became apparent that a superficial study of the actual milking routine was necessary as the job of concentrate feeding was inextricably tied up with the unit on/off time. This indicated that many of the units were on the cows for too long. It was discovered that a simple modification to the clusters would result in a considerable reduction in milking time and consequently feeding time.

In addition, it was considered that the whole ration was too complicated, especially as this resulted in a daily handling of well over 3,000 lb of feeding-stuffs; also that the cows were being overfed. A revised ration was designed omitting the heavier materials such as brewers' grains, potatoes and swedes and substituting dried sugar beet pulp and bean meal. By adjusting quantities, and especially by a reduction in oatmeal, the total dry matter, excluding purchased concentrates, was reduced to approximately 26 lb per cow. The revised ration was discussed between the two groups and confirmed as being suitable by a nutritional chemist at the Regional Office. Adoption of the proposed ration would result in a 50 per cent saving of the weight handled by the cowman and his assistant during the course of a day. Furthermore, if the modification to the clusters was also carried out, the total time saved in milking and feeding the revised ration would be over two hours per day, thus enabling the cowman either to start later in the morning or to be employed on other farm work.

### **Feeding young stock and heifers**

The second problem involved the feeding and littering of the young stock and housed dairy heifers. This demonstrated that although feeding was being efficiently carried out there was excessive walking. It also showed that the cattle yards and boxes were not being put to best use and that the method of milling the barley could be further improved. The assistant cowman also had to work with a wide variety of feedingstuffs, ranging from powdered milk to turnips, which were either carried in buckets or pushed around the buildings in a wheelbarrow on a peripheral system. This meant that he had to walk long distances outside the buildings in almost total darkness.

The observations enabled a string diagram to be prepared. This highlighted the excessive amount of walking necessary and paved the way to the final solution which was put forward. For a cost of about £150 it was demonstrated that most of the feeding could be done under cover by extending the internal feeding passage by about 45 ft so that the main cattle yard and block of loose boxes could all be fed on an internal system. This would reduce the distance walked daily by 9/10th of a mile, just over 50 per cent. The study also showed that even minor improvements such as re-positioning light switches, providing a water bowl in a loose box and putting the cold water tap near the hot tap could achieve considerable savings in time and effort.

The course proved to be a most interesting and beneficial practical exercise. It demonstrated that the detailed observations and accurate recording required for these types of studies are simple and relatively straightforward; they could be followed by many farmers with equally significant results.



*Well-grown Brussels sprouts plants in beds ready for transplanting*

## **Brussels Sprouts Production Problems**

**G. D. LeMay**

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IN recent years the Brussels sprouts crop has obtained a popularity among farmers and growers which is creating a major problem of over-production. Apart from an increased acreage in England and Wales, from 37,500 in 1966/67 to 54,000 in 1970/71, yields have also increased very substantially for various technical reasons. Output in 1966/67 was approximately 170 thousand tons and in 1970/71 it had increased to an estimated 223 thousand tons. The market was quite incapable of absorbing such production and the result was that prices reacted sharply, making the profitability of the crop of doubtful merit to the producer. Alleviation of the problem can be resolved only by either reducing the acreage grown or investigating market possibilities as there are indications that some outlets could be appreciably enlarged.

### **Market requirements**

The market now requires 'buttons' smaller in size than was generally accepted a few years ago; the most popular size for the fresh market is 1-2 in. in diameter. Anything over 2½ in. is difficult to sell, and the smallest sprouts are usually marketable only through processors for deep freezing. The market for the 'freezer' crop has expanded greatly in recent years although

there is currently evidence of some reduction in the demand for this commodity. This recession could, however, be relatively short-lived in view of an increasing interest being shown by the public in domestic deep freeze units.

There would appear to be a large market potential for prepared Brussels sprouts in a fresh state 'ready for the pot', particularly in the highly populated urban areas. Whatever method of marketing is used, the produce must be attractively prepared and presented to achieve the return commensurate with the costs of production and preparation.

### **Export opportunities**

Opportunities also exist for marketing Brussels sprouts in other European countries. The output of the crop in this country far exceeds the total produced in all the E.E.C. countries, where production seems to have remained constant over the last four years. There is little doubt that crops of high quality can be produced in this country which are capable of competing with any others produced in Europe, and advantage should be taken of the natural resources existing here. Very little so far appears to have been done to investigate the potential which exists for exporting this crop, but there is evidence that the high cost of transport and the need for temperature controlled containers need not be an impediment to the opening of a relatively lucrative export market. If such markets were created and expanded, however, it would become essential to have a very rigorous quality control.

### **Better management**

The potential yield from Brussels sprouts is enormous, but very rarely, if ever, is it achieved commercially. Many factors are involved, not least climatic conditions, but the manipulation and co-ordination of the resources available to farmers and growers frequently lacks cohesion and precision. Substantially higher average yields could be obtained with appreciably lower unit costs if greater attention was paid by management to detail, in particular timeliness of operation.

Better communications between management and labour could also lead to vast improvements in crop production. The lack of proper communication and supervision is more evident in the larger farming units. For example, problems often arise because workers are given no training or supervision concerning the calibration, proper use and maintenance of expensive equipment such as space drills, sprayers and harvesting machinery. To maintain or achieve high productivity, producers must examine their methods more critically, in the knowledge that the same output should be possible from a substantial reduction in acreage. With more attention to detail the consumer may expect to purchase a good product at a reasonable price, and this is perhaps the best way of expanding home sales.

### **Crop establishment**

To secure high yields of the correct quality, quick establishment of the crop and correct distribution in the field are essential.

Direct drilling is normally done when high plant populations—14,000 or more plants per acre—are required and can be extremely useful for crops to be harvested late in the season. The problems associated with direct drilling are immense, and damage caused by pigeons, partridges, skylarks, rabbits



and hares can reduce crop stands to an unacceptable level. Furthermore, Brussels sprouts are very sensitive to soil conditions at germination, and capping of the soil and drought conditions can substantially lower the required stand.

Most crops of less than 14,000 plants per acre are transplanted; this provides a better degree of control and establishment provided plant raising methods are good—perhaps this factor has been given too little attention in the past. Precision drilling in the seed-bed using a thin line, setting seed  $\frac{3}{4}$ –1 in. apart with 9–12 in. between rows usually arranged in a 'bed' system, will produce good strong plants for transplanting. More land is required for the seed-bed using this method, but a saving in time is made by having more uniform plants and less need for grading, to say nothing of the greater uniformity in the resultant crop.

## Varieties

There has been a dramatic increase over the past 5–6 years in the number of Brussels sprouts varieties and much improved stocks are now commercially available. There are, however, problems in selecting a variety. Many F1 hybrid varieties, with their inherent uniformity and apparent reliability, have become popular with producers, although they do not necessarily produce the highest yields and seed costs are high. The Dutch open-pollinated varieties seemed very superior to the old varieties when they were first grown in this country; alas, this superiority has not been maintained and some stocks are now extremely variable with a marked lack of quality of button. Some F1 hybrids have varied in character from year to year, although retaining the same name, thus leading to disappointment.

Although the choice of variety is important there is no 'best' unless other features of production and marketing are known, such as the intended harvesting period, the method of harvesting and the market to which the produce is to be consigned. Many variety trials and demonstrations are arranged in various localities each year; these can be very useful, but a selection of varieties should be tested by every grower each year.

Other difficulties are encountered with some of the new varieties, not least of which is the degree of susceptibility to disease and pest damage. Powdery mildew, in particular, has become a serious problem in the intensive brassica growing areas, and has also occurred in many other parts of the country over the last two or three years. No measurement has been made of its effect on yield, but in severe cases the quality can be extremely poor and may be rejected by the market. Some varieties, however, display a marked resistance to this disease.

Susceptibility to attack by cabbage aphid, the degree of damage to the plant and the rate of recovery are very complex problems which are at present undergoing research at the National Vegetable Research Station. There are marked varietal differences, although the possibility of plant breeders producing resistant material in the near future is unlikely.

## Pest control

Since resistance of cabbage root fly to the organo-chlorine compounds aldrin, dieldrin and BHC was established, problems have existed in obtaining a satisfactory control of this pest commercially. The transplanted crop is especially vulnerable to the ravages of the maggot as egg laying commences

in the south of the country about the end of April, and the first generation of cabbage root fly continues to lay eggs at a very high rate throughout May. This usually coincides with the transplanting of Brussels sprouts.

The easiest method of attempting to control this pest is the application of chlorfenvinphos or fonofos granules, usually applied immediately after transplanting either around the plants or in a narrow band along the rows. Unfortunately, the fly can penetrate the barrier layer of chemical applied to the surface soil, and eggs are often deposited under stones or clods of soil and can be found about 1 in. below the surface. In addition, where the plant 'rocks' after transplanting, the fly can lay its eggs between the soil and the stem of the plant some depth below soil level. In these circumstances, and certainly under dry conditions which frequently prevail during the latter part of May and early June, control of the insect is not always satisfactory by this means. Sub-surface placement has been used with considerable success. The application of granules in this way requires considerable precision, and it is necessary to obtain accurate depth control, usually about  $2\frac{1}{2}$  in. below soil surface. Watering after transplanting for the purpose of crop establishment is a fairly common practice in some parts of the country, and this affords an opportunity to apply a suitable chemical with the water for control of cabbage root fly.

This year for the first time, dimethoate granules have been used commercially and show promising control of Cabbage Root Fly when applied as a surface or sub-surface band. This chemical is systemic and will also control early aphids.

Caterpillars also create pest control problems, especially those of the diamond back moth and the garden pebble moth which damage Brussels sprouts buttons, as do the second and third generations of cabbage root fly. Control problems are aggravated by dense plant populations which make it difficult to get spraying and other equipment through the crop late in the season without doing extensive damage.



*Sub-surface injection coultter mounted between an A-blade and the planter coultter*

## Nutrition

Increased plant populations require fairly large quantities of nitrogen if high yields are to be obtained. 250–270 units nitrogen is about the right quantity for most of the newer varieties grown at 11,000 to 14,000 plants per acre.

Traditionally the application of nitrogen to Brussels sprouts was given partly in the base and partly as a top dressing. With close planting, however, application difficulties again arise in getting tractors and equipment through crops after the end of July or early August without doing substantial damage. Furthermore, recent research and experimentation indicate that splitting the applications of nitrogen is unnecessary; under most conditions all the nitrogen in the base is as good, if not better. This applies to a transplanted crop, but for crops direct drilled most of the nitrogen can be applied soon after singling.

## Single harvesting

In previous issues of *Agriculture* reference has been made by Brown (April 1969) and Tatham (February 1970) to mechanized or single harvesting of Brussels sprouts. This method has not developed rapidly and at present only a very small percentage of the total acreage is completely harvested by machine. By far the largest area is still picked over. Some crops are harvested by using machines and men (or women), that is by cutting the standing crop and removing the buttons by hand, or cutting the crop by hand and removing the buttons by machine strippers.

The techniques of growing high quality crops of acceptable commercial yields and with continuity of supply and marketing have been well established experimentally, and have been shown to be commercially viable; but, alas, mechanization lags behind. The machines for cutting the stems and stripping the buttons from the stems are perhaps good enough in themselves, but their prices are high when one takes into account the cost of manual labour still required. Furthermore, damage can be fairly substantial at every stage of handling and the increased demand for very high quality sprouts may lessen the adoption of mechanized harvesting unless improvements in the equipment can be made.

It is unlikely that the present field machinery for single harvesting would be suitable on all soil types, especially those which compact readily and which have a slow permeability. Some of these soils produce the best quality sprouts, and it may be necessary in these cases to have lightweight mobile harvesters.

When single harvesting is adopted, stopping the plants at predetermined times is essential for early harvesting. This is at present done entirely by hand, although some varieties respond to chemical treatment. The application of chemicals in a close-planted crop, however, presents the same problem as it does with those used for pest control.

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*Longhorn Ox*

Just Reminiscing . . .

## On Horns

John L. Jones

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SOME time ago I visited a farm on the windy vistas of Salisbury Plain where the farmer was indulging a somewhat unusual collector's preference. He was a connoisseur of horns in farm animals and claimed to have the longest horned bovines in Britain. His Longhorns looked like a page out of Britain's agricultural past, which indeed they were because, traditionally, horns have been one of the major distinguishing characters of cattle breeds and undoubtedly served a very valuable role in genetic identification.

Horn length was the first major method of classifying breeds and, as well as the Longhorn, the Middlehorn and Shorthorn classifications immediately spring to mind. The Middlehorns comprised the Devon, Sussex, Hereford and some of the Irish breeds. The Shorthorns were self-exemplifying. But it is the huge spread of the Longhorn that dominates the earlier history of British cattle.

### **Longhorn breed**

The Longhorns were found mainly in parts of Lancashire, Westmorland and Yorkshire. The horns of this old breed do indeed appear to have been truly enormous, and curiously enough seem to have increased in size and changed in shape as the breed was improved, particularly by the gene-

selecting genius of Bakewell. The unimproved Longhorns, slow to mature and with coarse grainy flesh, mostly had horns which went out horizontally from the head and then upwards. Selection for the economic factors of beef production, particularly for earlier maturing, seem to have introduced a genetic twist, for the horns began to grow in extremely odd ways. In some cases the growth of horn threatened to meet in front of the muzzle so that the beast was impeded from grazing: or to grow under the jaw itself and prevent the beast from opening its mouth at all. Bakewell's Longhorns were the first authentic single purpose beef cattle. Of them a near contemporary wrote, ' . . . during the reign of Bakewellian stock, no cattle displayed such a propensity to fatten as the Longhorns, and as the chest became deeper and more circular and the aptitude to fatten developed, so the horns lengthened'.

The horns of the Dishley or New Leicester Longhorn were described as follows: 'The horns vary with the sex. Those of the bulls are from 15 in. to two feet: those of the few oxen which have been reared of this breed are very large, being from two-and-a-half to three feet long: those of the cows are nearly as long but much finer, tapering to delicately fine points.' According to an early nineteenth century writer, the horn was an invaluable guide to an animal's breeding, a sort of genetic form book. 'The form of the horn', he wrote, 'sometimes tells tales of crosses long gone by or forgotten and totally unsuspected.' Horns were also claimed to be of value in telling the age of beasts over two years old through the rings which began to form at that age.



*Longhorn Cow*

### **Varied uses of horns**

Through the ages the horns of cattle have had a remarkable variety of uses because the keratin or albuminoid part becomes plastic under the influence of heat and moisture. Horns could be used for powder flasks and for making combs, or split into thin layers and used as a substitute for glass in the glazing of lanterns. King Alfred is reputed to have invented a transparent shield made of split horn to increase the accuracy of time candles, a primitive form of clock, by shielding them from fluctuations caused by currents of air. Drinking horns, goblets embellished and ornate, spoons, buttons,

musical instruments, knife handles, these are some of the many uses to which our ancestors put the horns of cattle and sheep. We still use the word 'horn' to describe some musical instruments. The horn of cattle even found its way into the nomenclature of education in the form of 'hornbooks', paddle-shaped pieces of wood to which the sheets of vellum or paper, carrying the alphabet or other lesson to be learned, were attached and covered with a sheet of transparent horn.



*A luxuriantly horned Jacob ram.*

### **Four-horned sheep**

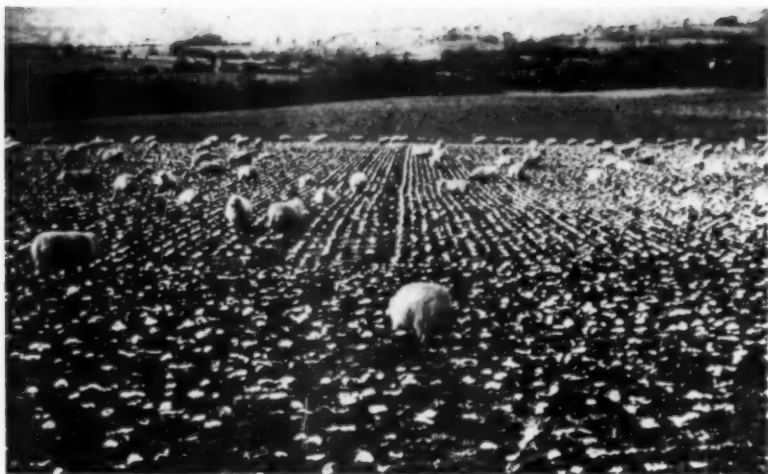
Among sheep breeds, the Jacob is the most luxuriantly equipped with horns. Pure Jacob matings produce both two and four horned sheep. The four-horn character probably derives from an early crossing either to the African piebald or Zulu sheep, or some of the four-horned breeds of the Scottish Islands, the Hebrides or St. Kilda. The four horns are found in both male and female, but mostly in the rams. The two pairs are oddly arranged. Mostly, the two upper horns grow upwards, curving back at the extremities, while the lower pair are curved round towards the nose. The horns are dark-coloured and in exceptional cases repeat the problem of the old Longhorn in that where the ingrowing habit is pronounced, they can interfere with the animal's grazing.

Some observers of animal behaviour make the claim that the presence or otherwise of horns has a distinct and discernible effect on the grazing habits of cattle. For example, the Highland cow, which has large branching horns, has a very marked habit of solitary grazing. Highland cattle are hardly ever seen grazing together in bunches, but are solitary roamers on the hill grazings, providing those statuesque poses against scree and sky which is the traditional image of this big-horned shaggy-maned breed. On the other hand, the polls like the Galloway are mostly seen grazing together in bunches, and when agitated, will escape as a herd.

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**John L. Jones, B.A.**, is an agricultural journalist who has contributed other articles in this journal recently.





*Sheep grazing direct-drilled swedes in March at 1,100 ft*

### ***Farming Cameo : Series 5***

## **4. Breconshire**

**Tonlas Evans**

BRECONSHIRE is probably one of the least known counties of England and Wales. Much of the commercial traffic from the Midlands and the North passes through the county on its way to the industrial parts of South Wales, as does the majority of the holiday traffic going to West Wales. Few travellers, however, have time to stop and explore the old town of Brecon, or the wonderful surrounding countryside.

The county is essentially hilly, with two-thirds of its area over 1,000 ft. Two main hill areas dominate the county, the Eppynt running west to east across the northern half and the Brecon Beacons running parallel across the southern half. The Eppynt, rising to about 1,500 ft, is largely owned by the State and used as an army training area. The Beacons rise to 2,900 ft and are now used more than ever as an area for recreation. Between these hills lies the fertile Usk Valley, narrow in the west and widening to the east, which is dominated by the town of Brecon. To the south of the Beacons lies what is largely the industrial part of Breconshire, adjoining the county of Glamorgan-shire.

Although the population of the ancient town of Brecon is only about 6,000, it is very much the focal point of the county with much of the social life centering around it. All public services are administered centrally from here and the Cathedral is the centre of the Diocese of Swansea and Brecon.

## Rainfall and soil

In the wetter western areas of the county the annual rainfall is about 100 in., which places a severe restriction on agriculture. The eastern part of the county is very different, however, with an annual rainfall of about 28 in., making it suitable for most forms of agriculture.

The soils of Breconshire deserve special note. They range from shales in the north to coal measures in the south, with the majority of those in the middle being derived from Old Red Sandstone. This is very fertile soil and is usually found to be of good depth. In marked contrast with other hill areas, there is little deterioration in soil with increased elevation and root crops of 28-30 tons per acre can often be grown at elevations of between 1,000 and 1,200 ft.

## Livestock

The combination of elevation and rainfall means that the greater part of the county is restricted to livestock production, with grass as the main crop. An unusual feature is that about one-third of the area is devoted to common grazing. The present number of breeding cows is over 30,000 and breeding ewes total 391,000.

The main sheep breeds are improved Welsh, Beulah speckled-face, Radnor, Clun and Cheviot. The last named was introduced in the early nineteenth century by Scottish farmers who came to the district. The main change in sheep management has been an increase in the numbers of lambs now being sold fat at the expense of the numbers going as stores.

The traditional type of cow is the Hereford, which single suckles her spring born calf; over the last three or four years, however, there has been a swing to crossbred cows which calve in the autumn. The bulls used are mainly Hereford, but with an increase in such breeds as Charollais, whose calves are bred by artificial insemination. Although most calves are sold in the October and November suckled calf sales, increasing numbers are being overwintered and sold fat or as forward stores. The sales, sponsored by the Suckled Calf Association, were some of the first to be held as a co-operative venture.

## Winter feeding

The main winter feed for cattle is oats, which is cut green and fed on the sheaf, and hay.

Traditionally, winter feeding of the ewes is based on swedes. These are grown on ridges and are fed *in situ*. The acreage grown has varied over the years and is now about 4,000. At one time, shortage of labour threatened the crop, but widespread adoption of precision drilling saved it. In recent years, the difficulty of growing a crop free from annual weeds has increased and the crop has suffered a further decline. During this decline ewe numbers still increased, and this created serious winter feeding problems on many farms.

To overcome this problem, in 1968 the Ministry's advisory staff in the area began to look with considerable interest at sward seeded kale, a technique made possible by the introduction of paraquat which had become popular in some dairying areas. If killing the sward by spraying with paraquat and direct drilling the root crop into the sward can be used successfully, the effect on sheep husbandry in the county could be enormous.

The initial trials were sufficiently encouraging for an increased acreage,

accompanied by detailed trials, to be grown by this method in 1969 and 1970. By 1971 the area grown in this way had risen to over 1,000 acres. Results have been variable, as one would expect with such an acreage grown on about one hundred farms, but the best crops have yielded up to 40 tons an acre. The advantages of the system are that it enables extra grazing in the spring, a saving in cultivation time, an improvement in moisture conservation, a solution of annual weed problems and better grazing conditions during the winter. In a county where little labour is employed these factors are very important and the rate of adoption of the new technique is a measure of its success to date.

Although Breconshire is a county full of agricultural tradition, recent changes do indicate that its farmers are willing to change their husbandry techniques or their farming systems when there is economic pressure, or where an advantage can be seen.

**Tonlas Evans, B.Sc.**, is a District Agricultural Adviser with A.D.A.S. at Brecon.

## Ministry Publications

Since the list published in the December 1971 issue of *Agriculture* (p. 549) the following publications have been issued.

### MAJOR PUBLICATIONS

#### REPORTS

- Animal Health Services in Great Britain. Report for 1970 (SBN 11 241501 6) (New) 80p (by post 86½p)
- Farm Classification in England and Wales 1969-1970 (SBN 11 240972 5) (New) 89p (by post 94½p)
- Northern Pennines Development Board. Second Annual Report for the year ended March 31, 1971. (Chairman T. Cowan) (SBN 11 240511 8) (New) 15p (by post 17½p)
- Report on Safety Health, Welfare and Wages in Agriculture, January 1st to December 31st, 1970. (SBN 11 241012 x) (New) 12p (by post 14½p)

#### EXPERIMENTAL PUBLICATIONS

- No. 20. Experimental Husbandry (SBN 11 240790 0) (New) 65p (by post 70½p)

#### FIXED EQUIPMENT OF THE FARM LEAFLET

- No. 51. Housing the Sow and Litter (SBN 11 240591 6) (Revised) 12p (by post 14½p)

#### MECHANIZATION LEAFLET

- No. 14. Boilers for the Nursery (SBN 11 240714 5) (Revised) 8½p (by post 11p)

### FREE ISSUES

#### ADVISORY LEAFLETS

- No. 18. Cabbage Root Fly (Revised)
- No. 100. Apple and Pear Canker (Revised)
- No. 139. Potato Virus Disease (Revised)
- No. 358. Salad Onions (Revised)
- No. 377. The Pollination of Apples and Pears (Revised)
- No. 456. Bulb Scale Mite (Revised)
- No. 459. Cream (Revised)

#### FARM WATER SUPPLY LEAFLET

- No. 2. Thinking Irrigation (New)

#### UN-NUMBERED LEAFLET

- Fowl Pest Control (Vaccination) (New)

*Priced publications are obtainable from Government bookshops (Addresses on p. 46) or through any bookseller. Single copies of free items are obtainable from the Ministry of Agriculture, Fisheries and Food (Publications), Tolcarne Drive, Pinner, Middlesex HA5 2DT.*

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# in brief

- Environmental research
  - Salute to the Archers
  - Cow care
- 

## Environmental research

MERELY to glance through the pages of the Natural Environment Research Council's Report for the year 1st April 1970—31st March 1971\*, is to become more deeply aware on the one hand of the environment hazards, active and potential, which militate against life in all its forms, and on the other of the constant research which is indispensable if we are to promote the tenets of a wise conservation philosophy. The Council was established in 1965 'to encourage, plan and execute research in those sciences, physical, geological and biological, that relate to man's natural environment and its resources'. The area of inquiry is, therefore, as wide as the incidence of life itself.

The contribution of the Nature Conservancy to this end forms a major part of the Council's responsibilities, and the Director's report in this sphere is of first importance to farmers, landowners and indeed everyone concerned with the future of Britain's countryside. Ecological interests must inevitably be concerned with the growing intensification of farmland use, the increase in reservoir construction, road building and sand, gravel and mineral extraction, to cite only a few of the environmental disturbances consequent upon present-day economic and social pressures. That the Nature Conservancy (to quote the report) 'wishes to ensure that while the maximum safeguards are afforded to nature conservation, they are nevertheless compatible with the needs for economic development', shows that a commendable sense of proportion and acknowledgment of relative priorities is an integral part of their deliberations.

On the subject of pesticidal pollution and wildlife and the general understanding of pollution as an important factor in human ecology, the Nature Conservancy has been to the fore for over ten years. The environmental effects of widespread mortality among wildlife and the consequential changes in relevant ecosystems touch intimately on the welfare of man. Field and laboratory studies have suggested that the magnitude of the decline of the common frog may be due partly to pesticides as well as to the extensive loss of wet habitats in recent years; but other hazards, such as were imposed by the use of organochlorine pesticides, especially dieldrin, have been reduced considerably by voluntary restriction.

It is something of a paradox, too, that whilst enjoyment of the countryside and its natural amenities, including wildlife, is spreading with every weekend family sortie, the increasing number of its visitors is actually having an adverse effect on the things they seek most to enjoy! One example quoted by the report is that of the great increase in skiing on the Speyside slopes of the Cairngorms, which has resulted in a great deal of soil erosion along the ski-tows and access routes. Similarly, the effects of public access to lowland grasslands, heaths, sand dunes, estuaries, lakes, rivers and the open uplands introduce influences that require to be watched.

The environment is a natural heritage and its full understanding can be attained only by the patient observation, recording and analysis of the data collected over its diverse fields. This report, whilst not exhaustive of the Council's activities, signposts the paths which have been opened up for further exploration.

\*Obtainable from H. M. Stationery Office, price 85p (90p by post)

### Salute to The Archers

EVEN the B.B.C.'s most sublime optimist could not have expected that when *The Archers* programme first went on the air it would be celebrating a non-stop run of twenty-one years this month. Progenitively, this radio 'everyday story of countryfolk' may be said to have arisen from such earlier outside rural broadcast programmes as *Country Calendar*, *Sunday Out* and *Over the Neighbour's Hedge*, with Godfrey Baseley seeking the right kind of formula to make it compulsive listening. As unlikely as it may seem, it was the serial programme *Dick Barton—Special Agent* which applied the spark at the suggestion of a Lincolnshire farmer, Mr. Henry Burt. From this matrix the whole concept of the Archer farming family and the fortunes of Ambridge village life have been cast. At its peak this five-days-a-week serial, slotted into the early evening key spot of the Light Programme from the Midland studios, claimed over ten million listeners.

Fundamentally setting out to help the less progressive farmers, the object has been primarily to entertain and, only by implication, to inform and educate. It should be said immediately that the many facets of rural life, reflecting the revolutionary changes through which country living has passed in the last two decades has been acutely observed and accurately portrayed. It follows that the research for the programme has constantly to be pursued in depth, bringing to the forefront not only the increasing application of farming technology and its accompanying impress of economic thought, but the associated concerns of countryside preservation, wildlife, gamekeeping, blood sports, local politics and the diminishing pockets of rural crafts.

To the hard core of the principal characters, a whole cavalcade of *dramatis personae* has passed before the microphone, far beyond the original conception of the serial's first scriptwriters, Ted Mason and Geoffrey Webb. Identified by voice alone, such is the verisimilitude of the drama, comedy and controversy of the Ambridge scene that its inhabitants are now nationwide intimates and their involvements a matter of public partisanship.

The device of the serial story, which exploits human curiosity, has long been a literary exercise and was seized upon by the early cinema. It was natural, therefore, that the radio (and now television) should also capture its audience by the same recipe. Many have come and gone, but *The Archers*, defying the years, is seen now to be competing with Tennyson's brook—a matter for congratulation to all concerned with its production. Its signature tune, *Barwick Green*, may not be in the charts—many people could not identify it by name—but as the herald of a unique entertainment with educational overtone, it is as well known as the National Anthem. Accepting that nothing succeeds like success, it may not be outside the realm of possibility that the Archer saga has only now completed its formative years!

### Cow care

THERE is nothing novel in the exhortation of farmers and their stockmen to keep detailed records of their dairy animals' performance, although precept is still running ahead of full practice. But cast in the mould of the Midland Bank's new colour film, *Cow Care*, the advice not only comes over loud and clear but actually woos its audience while it entertains. It portrays the changes imposed on the guiding principles by which stockmen now responsible for bigger herds have moved on to planes of higher productivity and emphasizes the importance of good parlour planning, notoriously a weak point in many a dairy set-up. The film, which runs for about twenty-five minutes, can be borrowed from Midland Bank Public Relations and Advertising Department, Poultry, London EC2P 2BX.

AGRIC

# Books

## Hill Farming Research Organisation Fifth Report (1967-70).

The report describes in detail selected areas of research work carried out by the Hill Farming Research Organisation over the past three years. It is an eminently readable and informative book intended primarily for scientists and specialist advisers who have an interest in the scientific findings and who wish to further consider the practical testing and application in hill areas. As the report does not present all the research work of the Organisation during the period, other sections of research activity are listed in a summary of the current programme. The research programme has set out to examine the consequences of management changes upon pasture utilization.

Section 1 describes work on plant nutrient circulation and the factors affecting utilization by plants of potentially available nutrients.

Section 2 deals with research related to heather production, outlining some of the management effects on heather and comparing productivity with other vegetation types.

In section 3, emphasis is placed on the effects of removing some of the nutritional limitations in the hill environment. The degree to which ovulation rate and embryo mortality can be influenced by nutrition, in particular, is explored. Other factors, such as the consequences of variations in climate and management, are observed. The practical implications of high body condition in the hill ewe, as an important requirement for high ovulation rate, are discussed.

Work on the lactation of hill ewes is extremely sparse, and the results of this experiment indicate that the stage of lactation is an overriding factor governing the response in terms of milk production to increased nutrition.

A recent innovation to the Organisation's research programme is the inclusion of systems development projects. These are designed to test the principles which decide on the integration of resources in better systems of sheep production from hill land.

The final section of the report provides data and illustrated maps on the distribution of livestock in hill areas of Scotland. It analyzes and indicates trends in numbers of hill sheep and hill cows—which must be of topical interest, particularly in relation to afforestation developments. The data provides useful information of stocking rate and also indicates that hill farming is continuing to make an increasing contribution to agricultural output.

This is an invaluable reference for all scientific and technical workers concerned with the interpretation of data and the further development of technological advances in hill farming. The report, like its predecessors, demonstrates that output can be increased by relatively simple measures of land improvement, fencing, regeneration and controlled grazing, and by the willingness to adopt proven methods of improved nutrition and husbandry techniques.

Copies of the report can be obtained free from the Hill Farming Research Organisation, 29 Lauder Road, Edinburgh, EH9 2JQ.

S.A.C.O.

## The Archers. GODFREY BASELEY. Sidgwick and Jackson, 1971. £1.95.

Godfrey Baseley's book, whilst ostensibly autobiographical, quickly resolves itself into the story of the conception, birth and growth to maturity of his brainchild, *The Archers*. Whatever else this Worcestershire-born son of a village butcher has done, or is likely to do, he will be remembered above all as the sire of a radio saga that has projected the everyday life of an imaginary rural community, with all its personal relationships, anxieties, drama, romance and comedy against a progressive farming background, into the homes of millions in town and country alike. But though, as editor, the author pilots the programme, he is at pains to emphasize the importance of the teamwork and spirit of collaboration at all levels, without which it would never have succeeded. He also acknowledges with gratitude the infinite help and advice which so many farmers and professional bodies have given, since authenticity in every detail has been the aim of the programme from its inception.

Looking back over the twenty-one years that this daily serial has gone on the air from the B.B.C.'s Midland studios, Mr. Baseley recalls the fluctuating fortunes that have inevitably attended the programme. Criticism and even derision have been no less well marked than praise; there have been the occasional *faux pas* that produced



some very red faces, as when a dressing of 2 tons of nitrogen to the acre instead of 2 cwt was put on a field at Brookfield Farm. For a number of listeners fiction has become fact, and the author's anecdotes in this vein reveal some amusing sequels. Like *The Archers*, this book is informative while it entertains and grows in interest as it proceeds.

S.R.O'H.

**Control of Bovine Mastitis.** Papers given at a meeting organized by The British Cattle Veterinary Association and the Agricultural Education Association at the University of Reading, January 1971. Edited by F. H. Dodd and E. R. Jackson.

If ever there was a report which should be in the hands of all veterinary surgeons, dairy farmers, agricultural and veterinary science students, this is it. All the research work done by the National Institute for Research in Dairying and the Central Veterinary Laboratory is brought together. The papers, in easily readable form, set out what men who handle dairy cows should understand about the risks involved and what they can do to effect a level of control in this most persistent and widespread disease.

Information is given concerning the causative organisms, their distribution and the nature of the disease, while the relative importance of clinical and sub-clinical mastitis is emphasized; sub-clinical infections caused by staphylococci are found to be most prevalent in British dairy herds.

Control measures, which include teat dipping and dry cow therapy, having been thoroughly tested on a field scale, are discussed in detail and it has been shown that 'the level of infection in the herd is influenced mainly by the reduction in duration of infection rather than by the reduction in the new infection rate'.

One section of the report deals in interesting detail with the prevention and elimination of intramammary infections and makes special reference to less common pathogens which may cause mastitis.

The work done on disinfectant teat dips is valuable and the efficiency of iodophors (0.5 per cent iodine) and sodium hypochlorite (4 per cent chlorine) demonstrated.

A very important section deals with the influence of the milking machine on the incidence of udder disease. It states that 'at present it is known that the rates of new infections in herds using the same hygiene and therapy routines can vary tenfold'. Work is still going on to ascertain how much of this variation is due to milking machine

factors, genetic differences between cows or other environmental factors.

A detailed evaluation is made of the methods used in the research undertaken, together with a section on the value of a national cell counting programme, and the role of the support laboratory.

It would be impossible to study this report without coming to the conclusion that since a proportion of new mastitis infections can be prevented by the application of good hygiene, then the level of maintenance and management in many of our dairy herds is not good enough to eliminate risks.

Finally, the section of the report which deals with the role of practitioners and dairy husbandry advisers in the application of a nationwide mastitis control scheme is well worth attention, for as a result of this excellent research work there is now a positive message which must be conveyed to all dairy farmers without delay.

Copies of the report can be obtained from The Agricultural Development Association, Cliftonfield, Shipton Road, York, YO3 6RA. Price £1.40, post free.

K.D.M.

**Report of Long Ashton Research Station, 1970. £1.25.**

In his Director's introduction, Professor J. P. Hudson draws special attention to the Station's work on pollination and fruit set. This has reached the stage when it seems likely to have immediate and perhaps far-reaching effects on Britain's apple growing industry, for it offers the prospect of smoothing the wild, unpredictable and unavoidable fluctuations in yield which at present have such a depressing effect on planning and marketing.

It is only a few years since research initiated at Long Ashton suggested that inadequate pollination might be the reason why many British apple orchards fail to produce full crops regularly. Subsequent large-scale orchard experiments confirmed this and it now seems likely that provision of extra pollen is the key factor in achieving optimum fruit set in most orchards.

Long Ashton's scientists are therefore seeking practical methods by which supplemental pollination can become economically possible (a booklet for growers, entitled *Towards Regular Cropping\**, has been published, giving recommendations for methods of improving fruit set in existing orchards, discussing possible future developments and reviewing various practical aspects of pollination).

As in previous years, much of this clearly presented report describes the

progress of long term work. Some of the subjects covered in the thirteen main sections are primarily of interest to horticultural scientists, e.g., biochemical studies of plant hormones and enzyme systems. Nevertheless, growers will find many interesting items and thought-provoking ideas, for instance on new pest and disease control materials and techniques, besides a wealth of valuable information on such practical matters as spray application and crop nutrition.

The Station received fewer demands during the year for budwood of virus-tested clones, mainly because propagating material is now available from nurserymen who have mother trees. Supporting evidence for the value of virus-tested material is

accumulating; pears, like apples, maintain adequate growth with lower fertilizer applications when virus-tested trees are grown.

Details of the latest research on cider and fruit juices are included, plus a section on home food freezing. The further extension of the scientific liaison section's activities reflects the Station's keen interest in strengthening communications with the industry it serves, the advisory services and fellow research centres. No one who wishes to keep in touch with fruit research can afford to be without the report.

S.L.

*\*Edited by R. R. Williams and D. Wilson.  
Grower Books.*



## Agricultural Chemicals Approval Scheme

*There are no Additions or Amendments to the 1971 List of Approved Products for Farmers and Growers this month.*

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## **The Changing Structure of Agriculture**

The publication in 1966 of a report on 'The Structure of Agriculture' marked a new stage in the development of agricultural statistics in the United Kingdom and was made possible by automatic data processing of the agricultural censuses. The present report shows that significant changes are taking place and indicates what these changes are.

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*Agricultural Bulletins:*

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In recent years there has been much research into bee behaviour and swarming in particular has received considerable attention. In this new publication, the Ministry of Agriculture, Fisheries and Food's Bee Group relates the work of research scientists to practical bee-keeping. (Bulletin 206)

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## **Beneficial Insects and Mites**

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## **Illustrated Agricultural Bulletins published by Her Majesty's Stationery Office**

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Guide to the design and equipping of poultry houses to present day standards (No. 56) **55p (60½p)**

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